

Stress-Relief Phenomena Observed During Solution Mining in Western New York

by

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INTRODUCTION

The Wyoming Valley is a northeasterly trending glaciated trough located in northeastern Wyoming County, New York. Near the Village of Wyoming, the valley is filled with more than 300 feet of glacial drift and postglacial alluvium. The valley floor is approximately 4000 feet wide, and approximately 350 feet of topographic relief exists in the Valley (Fig. 1).

Solution mining from the B unit of the Vernon Formation was initiated just south of the Village of Wyoming in 1986. The Wyoming brine field presently consists of 44 wells which are distributed over an area which extends from the center of the valley floor southeastward into the adjacent rolling upland (Fig. 1). The stratigraphic section in the brine field is inclined southward at approximately 60 feet per mile, and the entire section thickens toward the Appalachian Basin. Analysis of geophysical logs of all brine wells has demonstrated that no abrupt or unusual stratigraphic changes occur within the brine field. Neither the geophysical logs, nor surface geology contain any evidence of folding or faulting. Subsidence monitoring data contain no evidence of ground motions which can be attributed to closure of cavities created by solution mining (Brennan, 1993).

Beginning in 1994, maintenance and plugging operations revealed that entry to some well casings was blocked (apparently by crimping) at a depth of approximately 300 feet. As a result, it was necessary to remove the blockage by drilling (over a six foot interval) in order regain entry. The wells with blockage are located only along the lower portion of the valley wall and adjacent to the valley floor. No blockage has been observed in wells located either on the valley floor or a distance of more than 1500 feet into the upland to the southeast. The consistent characteristics of this problem suggest a direct relationship to stress-relief phenomena that are well known in the region.